IN THE CLAIMS:

Please amend the Claims as follows:

1. (Original) An online monitoring method for a fossil fuel converter apparatus, which monitors fossil fuel compositions in real time by measuring operating data of the converter apparatus, characterized in that said online monitoring method comprises the following steps:

a) Determining reactant compositions and number of variables thereof;

b) Determining fossil fuel compositions and number of variables thereof;

c) Determining compositions of incomplete products among resultants and number of variables thereof;

d) Determining relationship between the fossil fuel compositions and calorific value;

e) Establishing an equation set involving the fossil fuel compositions, the reactant compositions and the resultants compositions, according to energy balance relationship and material balance relationship in the combustion process;

f) Providing given conditions for use of the above equation set, wherein said given conditions are independent relationships concerning the variables in the above equation set;

g) Measuring boiler operating data and assigning the variables in the above equation set, wherein the sum of the number of the assigned variables and the number of the above given conditions are equal to the sum of the number of variables of the reactant compositions, number of variables of fossil fuel compositions and number of variables of incomplete products compositions, so as to achieve a positive definite condition of the equation set; and

h) Finding the solution to the equation set and obtaining real-time monitoring data of the fossil fuel converter apparatus.

2. (Original) The online monitoring method for a fossil fuel converter apparatus according to claim 1, characterized in that said fossil fuel is coal.

3. (Original) The online monitoring method for a fossil fuel converter apparatus according to claim 2, characterized in that said fossil fuel converter apparatus is a coal-fired boiler and the reactant is air, wherein,

In step (a), the compositions of air include O_2, N_2 and steam of a constant proportion, and the content of micro-gas including H_2, CO_2 and Argon is set to be zero;

In step (c), the change of ash ratio and change of carbon content of slag is set to be zero, and nitrogen oxide content of flue gas is set to be zero;

In step (b), ultimate analysis compositions of coal is determined to be C, H, O, N, S, M and A;

In step (d), said relationship is a Mendeleev's equation, or an empirical formula of calorific value of coal, which is expressed by the above elementary compositions;

In step e), according to the energy balance relationship in the combustion process:

The total calorific value of coal should be equal to the sum of boiler heat absorption and losses, and the pulverizing system has a thermal balance;

Wherein the material balance relationship is as follows:

Element C content is equal to C content of CO_2, CO in flue gas and of the unburned carbon in ash; element S content is equal to S content of SO_2 in flue gas; the mass of steam in flue gas is equal to the sum of H_2O produced from H combustion, H_2O in air and M of coal; the sum of O_2 content of air and the amount of O_2 produced from element O of coal should be equal to the sum of the amount of O_2 consumed by the oxidation of SO_2, CO_2 and CO, the amount of O_2 used for H combustion and the amount of the remaining O_2 in fuel gas; the sum of N_2 content of air and the amount of N_2 generated by element N of coal should be equal to N_2 content in fuel gas; the sum of boiler ash and slag is equal to A content of coal;

And establishing an equation set;

In step f), said given conditions are:

Regressive equation, empirical formula or set relationship between compositions of elements H and N;

Regressive equation, empirical formula or set relationship between compositions of elements C and O; and

Regressive equation, empirical formula or set relationship between compositions of elements C and H;

In step g), the boiler operating data are measured to form the restricting conditions for the equation set so as to realize positive definite conditions of the equation set and the positive definite conditions of the equation set are selected from the following restricting conditions for the equation set formed by measuring boiler operating data:

The amount of boiler heat absorption calculated according to the measured boiler steam/water parameters;

Total moisture M of coal calculated according to the coal flow-rate, air flow-rate and temperature of the pulverizing system;

Total amount of coal feeding;

Total air input;

Amount of dry flue gas;

Amount of fly-ash and slag or ash content of coal;

Carbon content of fly-ash;

SO_2 content of dry flue gas;

O_2 content of dry flue gas;

CO content of dry flue gas;

CO_2 content of dry flue gas;

N_2 content of dry flue gas; and

H_2O content of flue gas.

4. (Original) The online monitoring method for a fossil fuel converter apparatus according to claim 3, characterized in that, in step g), said boiler operating data is measured to form the restricting conditions for the equation set so as to realize positive definite conditions of the equation set and the positive definite conditions are selected from the following restricting conditions for the equation set formed by measuring boiler operating data:

The amount of boiler heat absorption calculated according to the measured boiler steam/water parameters;

Total moisture M of coal calculated according to the coal flow-rate, air flow-rate and temperature of the pulverizing system;

Total amount of coal feeding;

Total air input;

Amount of dry flue gas;

Amount of fly-ash and slag or ash content of coal;

Carbon content of fly-ash;

SO_2 content of dry flue gas;

O_2 content of dry flue gas;

CO content of dry flue gas;

CO_2 content of dry flue gas;

N_2 content of dry flue gas; and

H_2O content of flue gas;

According to the number of given conditions, measurement restricting conditions which are independent of the given conditions and independent of each other are selected from the measurement restricting conditions so that the total number of given conditions and measurement restricting conditions reaches ten.

5. (Original) The online monitoring method for a fossil fuel converter apparatus according to claim 4, characterized in that, regarding a direct-firing pulverized coal boiler, said given conditions select two from the following three items:

Regressive equation, empirical formula or set relationship between compositions of elements H and N;

Regressive equation, empirical formula or set relationship between compositions of elements C and O; and

regressive equation, empirical formula or set relationship between compositions of elements C and H; and

The restricting conditions formed by the measured boiler operating data select the following seven items:

The amount of boiler heat absorption calculated according to the measured boiler steam/water parameters;

Total moisture M of coal calculated according to the coal flow-rate, air flow-rate and temperature of the pulverizing system;

Total amount of coal feeding;

Total air input;

SO_2 content of dry flue gas;

O_2 content of dry flue gas;

CO content of dry flue gas; and

one of the following items is selected:

CO_2 content of dry flue gas;

N_2 content of dry flue gas; and

H_2O content of flue gas;

Amount of dry flue gas; and

Carbon content of fly-ash.

6. (Original) The online monitoring method for a fossil fuel converter apparatus according to claim 4, characterized in that, regarding a middle-storage pulverized coal boiler, said given conditions select two from the following three items:

Regressive equation, empirical formula or set relationship between compositions of elements H and N;

Regressive equation, empirical formula or set relationship between compositions of elements C and O; and

Regressive equation, empirical formula or set relationship between compositions of elements C and H; and

The restricting conditions formed by the measured boiler operating data select the following seven items:

The amount of boiler heat absorption calculated according to the measured boiler steam/water parameters;

Total moisture M of coal calculated according to the coal flow-rate, air flow-rate and temperature of the pulverizing system;

SO_2 content of dry flue gas;

O_2 content of dry flue gas;

CO content of dry flue gas; and

Three of the following items are selected:

CO_2 content of dry flue gas;

N_2 content of dry flue gas; and

H_2O content of flue gas;

Amount of dry flue gas; and

Carbon content of fly-ash.

7. (Original) The online monitoring method for a fossil fuel converter apparatus according to claim 3, characterized in that, regarding bituminous coal, the regress equation, empirical formula or set relationship of element compositions selects:

Regressive equation between compositions of elements C and O; and

Regressive equation between compositions of elements H and N.

8. (Original) The online monitoring method for a fossil fuel converter apparatus according to claim 3, further characterized in that, regarding anthracite, the regress equation, empirical formula or set relationship of element compositions selects:

Regressive equation between compositions of elements C and N; and

Regressive equation between compositions of elements H and N.

9. (Original) An online monitoring method for a fossil fuel converter apparatus according to claim 3, further characterized in that, regarding brown coal, the regress equation, empirical formula or set relationship of element compositions selects:

Regressive equation between compositions of elements C and O; and

Regressive equation between compositions of elements H and N.

10. (Original) The online monitoring method for a fossil fuel converter apparatus according to claim 3, characterized in that, a proximate analysis result of volatile matter of coal is found according to then regressive equation or an empirical formula of elementary constitution of coal and volatile matter.

11. (Original) The online monitoring method for a fossil fuel converter apparatus according to claim 3, characterized in that,

The following given conditions can be added to said equation set:

A proportion between the content of any two of elements C, H, O, N and S in the ash and moisture free base of coal is relatively stable;

Amount of air necessary for combustion of each kilogram of ash and moisture free base;

Amount of dry flue gas generated from the combustion of each kilogram of ash and moisture free base ;

Amount of heat generated from the combustion of each kilogram of ash and moisture free base ; and

Hydrogen content necessary for the combustion of each kilogram of ash and moisture free base.

12. (Currently amended) The online monitoring method for a fossil fuel converter apparatus according to claim 3 ~~or 11~~, characterized in that,

Said forming the restricting conditions for the equation set by measuring boiler operating data so as to realize positive definite conditions of the equation set including:

Selecting six of the following restricting conditions for the equation set formed by measuring boiler operating data:

The amount of boiler heat absorption calculated according to the measured boiler steam/water parameters;

Total moisture M of coal calculated according to the coal flow-rate, air flow-rate and temperature of the pulverizing system;

Total amount of coal feeding;

Total air input;

Amount of dry flue gas;

Amount of fly-ash and slag or ash content of coal;

Carbon content of fly-ash;

O_2 content of dry flue gas;

CO content of dry flue gas; and

H_2O content of flue gas.

13. (Original) The online monitoring method for a fossil fuel converter apparatus according to claim 12, characterized in that, regarding the direct-firing pulverized coal boiler, said restricting conditions formed by measuring boiler operating data select the following six items:

The amount of boiler heat absorption calculated according to the measured boiler steam/water parameters;

Total moisture M of coal calculated according to the coal flow-rate, air flow-rate and temperature of the pulverizing system;

Total amount of coal feeding;

Total air input;

O_2 content of dry flue gas;

CO content of dry flue gas.

14. (Original) The online monitoring method for a fossil fuel converter apparatus according to claim 12, characterized in that, regarding the middle-storage pulverized coal boiler, said restricting conditions formed by measuring boiler operating data select the following six items:

The amount of boiler heat absorption calculated according to the measured boiler steam/water parameters;

Total moisture M of coal calculated according to the coal flow-rate, air flow-rate and temperature of the pulverizing system;

O_2 content of dry flue gas;

CO content of dry flue gas; and

H_2O content of flue gas; and

Amount of dry flue gas.

15. (Original) The online monitoring method for a fossil fuel converter apparatus according to claim 1, characterized in that, said fossil fuel is fuel gas.

16. (Original) The online monitoring method for a fossil fuel converter apparatus according to claim 1, characterized in that, said fossil fuel is fuel oil.

17. (Original) An online monitoring device for a fossil fuel converter apparatus, comprising a computer, a data input passage for collecting converter apparatus operating data, and an output data display/output passage, for monitoring a fossil fuel converter apparatus in real-time, characterized in that, said online monitoring apparatus comprises:

Means for storing reactant compositions, fossil fuel compositions, resultants compositions, and relationship between the fossil fuel compositions and calorific value;

Means for storing an equation set involving the fossil fuel compositions, the reactant compositions and the resultants compositions, according to energy balance relationship and material balance relationship in the combustion process;

Means for providing given conditions for use of the above equation set, wherein said given conditions are equations concerning variable relationship in the above equation set;

Means for, according to measured boiler operating data, assigning the variables in the above equation set to form positive definite conditions of the equation set, wherein the sum of the number of the assigned variables and the number of the above given conditions are equal to the sum of the number of variables of the reactant compositions, number of variables of fossil fuel compositions and number of variables of incomplete resultants compositions; and

Means for finding the solution to the equation set to obtain real-time monitoring data of the fossil fuel converter apparatus.

18. (Original) The online monitoring device for a fossil fuel converter apparatus according to claim 17, characterized in that said fossil fuel converter apparatus can be selected from the group consisting of: pulverized coal boiler, circulating fluidized bed boiler, integrated gasification combined circulating power generator, gas-turbine combined circulating power generator, and fuel cells.

19. (New) The online monitoring method for a fossil fuel converter apparatus according to claim 11, characterized in that,

Said forming the restricting conditions for the equation set by measuring boiler operating data so as to realize positive definite conditions of the equation set including:

Selecting six of the following restricting conditions for the equation set formed by measuring boiler operating data:

The amount of boiler heat absorption calculated according to the measured boiler steam/water parameters;

Total moisture M of coal calculated according to the coal flow-rate, air flow-rate and temperature of the pulverizing system;

Total amount of coal feeding;

Total air input;

Amount of dry flue gas;

Amount of fly-ash and slag or ash content of coal;

Carbon content of fly-ash;

O_2 content of dry flue gas;

CO content of dry flue gas; and

H_2O content of flue gas.